

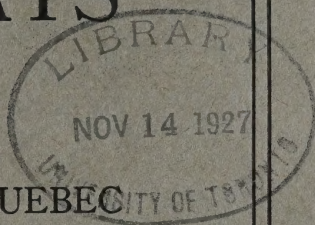
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BANNER OATS

THE BEST VARIETY FOR QUEBEC



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BANNER OATS

IMPORTANCE OF OATS IN QUEBEC

Oats are grown more extensively in the province of Quebec than any other crop with the exception of hay: practically every farmer grows this crop. Without doubt oats will keep this important position for many years because of their wide suitability for this section of Canada.

CLIMATE FAVOURABLE.—Oats require fewer days and less heat units to attain maturity than spring wheat, and it is generally admitted that they are naturally adapted to colder regions than barley.* The cool and usually moist climate of most of the province of Quebec is particularly suitable for the growing of oats of high quality.

GROWN FOR DIFFERENT PURPOSES.—Besides being grown alone or in combination with other grains for the matured seed, oats may be used for other purposes. When meadows are winter-killed, oats can be cured for hay, and mixed with field peas; they can be cut as green feed; put into the silo; or left to ripen if too large an area has been sown for these uses.

GOOD FOR LIVE STOCK.—As a feed for live stock, oats can hardly be excelled. For horses of any age, they are the safest of all grains; in the form of meal there is nothing better for dairy cattle, if prices are reasonable; for sheep, especially breeding ewes, they are the standard concentrate when mixed with bran; fed whole on the floor, they provide exercise for swine during winter; if not shrivelled they can form part of the ration of layers; and when ground, can be used in the mash or for chicks, if hulls are sifted out.

YIELD MORE THAN OTHER CEREALS.—Careful tests at the Cap Rouge Experimental Station, for an average of thirteen years, on a sandy loam of better than average fertility, have shown that oats yield more pounds of grain per acre than barley or spring wheat. Very important also from a live stock feeding point of view, is the fact that they produce more digestible nutrients per acre than either barley or wheat.

YIELD OF OATS IN QUEBEC

The figures in table 1 were furnished by the Dominion Statistician, Ottawa, and illustrate the comparative increase in acreage and yield per acre of oats in the various provinces.

TABLE 1.—PRODUCTION OF OATS—1920-1925

| Where Produced | 1900 | | 1910 | | 1920 | | 1925 | |
|---------------------------|-----------|------------------|-----------|------------------|------------|------------------|------------|------------------|
| | Acres | Bushels per acre | Acres | Bushels per acre | Acres | Bushels per acre | Acres | Bushels per acre |
| Canada..... | 5,368,000 | 28.2 | 8,656,000 | 28.4 | 15,850,000 | 33.5 | 14,672,320 | 35.0 |
| Prince Edward Island..... | 164,000 | 27.8 | 182,000 | 28.6 | 183,000 | 27.8 | 168,727 | 32.7 |
| Nova Scotia..... | 91,000 | 25.8 | 96,000 | 31.0 | 153,000 | 30.3 | 117,174 | 33.1 |
| New Brunswick..... | 187,000 | 25.8 | 201,000 | 27.6 | 309,000 | 29.5 | 225,402 | 30.2 |
| Quebec..... | 1,350,000 | 24.8 | 1,392,000 | 24.3 | 2,206,000 | 30.3 | 1,856,000 | 29.1 |
| Ontario..... | 2,707,000 | 32.6 | 2,871,000 | 31.3 | 2,880,000 | 44.9 | 2,837,390 | 41.6 |
| Manitoba..... | 574,000 | 18.5 | 1,209,000 | 25.1 | 1,874,000 | 30.8 | 1,922,377 | 37.3 |
| Saskatchewan..... | 142,000 | 16.0 | 1,888,000 | 31.2 | 5,107,000 | 27.7 | 5,071,507 | 34.5 |
| Alberta..... | 118,000 | 32.1 | 783,000 | 21.6 | 3,089,000 | 37.3 | 2,397,350 | 31.5 |
| British Columbia..... | 34,000 | 42.4 | 33,000 | 53.5 | 48,000 | 34.8 | 76,393 | 36.8 |

The table shows that the acreage of oats in Quebec, during the last quarter of a century, increased from 1,350,000 acres in 1900 to 1,856,000 acres in 1925,

* North Dakota, Bull. 47.

an increase of over 37 per cent, which is more than for any other province east of Manitoba. Unfortunately, the increase in bushels per acre, during the same period, was only 4.3 or 17 per cent, which is less than for any of these same provinces. And the saddest part of all is that the average yield per acre, for 1925, is the lowest recorded for any province in Canada. The table shows that there is opportunity for a considerable increase in the bushel yield per acre in Quebec. That this can be brought about with little increase in production costs it is the purpose of this pamphlet to show.

A CHEAP WAY TO IMPROVE YIELD

Yield is affected by many things such as hardiness, time of maturing, resistance to disease, strength of straw, and quality of grain, but the most important factor is the inherent yielding power of a variety. If the highest-yielding variety is used, the extra number of pounds of grain per acre costs nothing for rent of land, proportion of manure, use of machinery, seed treatment, and very little more for twine or for manual and horse labour.

VARIETY AND STRAIN TESTS NECESSARY.—As general appearance gives no clue to the yielding power of a variety or strain, each one must be tested for yield. This has been done at the Cap Rouge Experimental Station with oats for the last fifteen years, and the results are given in this pamphlet. As differences of soil and climatic conditions are important factors in variety-testing it is well to state that the trial plots were on a sandy loam of better than average quality; the average for the five growing months, May to September inclusive, was 59.25° F. for mean temperature, 20.12 inches for precipitation, 1007.7 for hours of sunshine; and the frost-free season extended 138 days.

LOW AND HIGH-YIELDING VARIETIES COMPARED.—That these tests are important is shown by the figures given in table 2. Certain years are selected and reported upon in this table because they are the only years in which the two varieties under review were compared.

TABLE 2.—COMPARISON OF A LOW-YIELDING AND HIGH-YIELDING VARIETY OF OATS

| Variety | Pounds of grain per acre | | | | | Average for 5 years |
|-----------------|--------------------------|-------|-------|-------|-------|---------------------|
| | 1911 | 1913 | 1914 | 1915 | 1916 | |
| Eighty Day..... | 2,430 | 2,400 | 1,600 | 1,758 | 1,768 | 1,991 |
| Banner..... | 2,820 | 2,340 | 1,960 | 2,404 | 2,398 | 2,384 |

The table gives the yields of two varieties of widely different yielding power in order to illustrate clearly the wide variance in ability to yield. If all Eighty Day oats instead of Banner had been sown in 1925 in the province of Quebec, there would have been a difference of \$10,941,120 in the value of the crop, estimating the selling price at 1½ cent per pound or 51 cents per legal bushel of 34 pounds.

OAT GROUPS

Before coming to a consideration of the variety and strain tests of oats made at the Cap Rouge Experimental Station, it seems better to look into the classification of this cereal, so that the results of the experimental work may be better understood.

Taxonomists have separated oats in as many as 137 varieties, but only the general groups will be mentioned here.

GROUPS OF MINOR IMPORTANCE

ABYSSINIAN OATS.—Cultivated in certain parts of Abyssinia and Arabia, and characterized by the four awn points of the flowering glume.

HAIRY OATS.—Grown in some parts of the Orkney and Shetland islands; may be recognized by the long, narrow flowering glumes which have two awn points.

SHORT OATS.—A crop of portions of Portugal, Spain, France, and Germany; distinguished by its two short, blunt, rather toothed than awn-pointed flowering glumes.

RED OATS.—The one generally sown in the autumn, in the southern regions of the United States; divided from the others by the persistency of its upper grains to their rachillas.

IMPORTANT GROUPS IN CANADA

HULLESS OATS.—This group is easily distinguished because the flowering glume and palea do not clasp the caryopsis, so that the hull is not retained, as in common oats, and the grain threshes free from it. There are varieties with side and others with spreading panicles, but the latter only are known in America and are not commonly grown. Practically all strains are selections from or crosses with the Chinese hullless parent, *Avena nuda Chinensis*.

They have not come into general favour on account of the following disadvantages: they are quite susceptible to smut, and treatment with formalin is liable to affect their germination; the absence of hulls seems to affect the process of respiration in the kernel, and they go out of condition quite rapidly when stored in large quantities; they lose vitality in a short time, seed a year old showing a comparatively low percentage of germination.

Their chief use is for the house, where they can be ground in small quantities and used as oatmeal, or as feed for young live stock and poultry, though in the latter case they should be fed judiciously to prevent scouring or indigestion. The great argument in their favour is that they are all digestible whilst the hulls of the other groups, though performing a useful mechanical function when fed with the kernels, rarely contain even as high as 3 per cent of protein.

It can be safely asserted that Hullless Oats cannot be recommended until better yielding varieties are developed. When Liberty was brought out in 1917 by the Central Experimental Farm, at Ottawa (a cross between Chinese Naked and Swedish Select) it looked very promising because stiffer-strawed than most others of the same group. But when compared with Banner, at the Cap Rouge Station, it yielded decidedly less digestible nutrients per acre. (See table 3).

TABLE 3.—A COMPARISON OF HULLESS AND HULLED OATS AT CAP ROUGE

| Year | Hullless Oats "Liberty" | | | Hulled Oats "Banner" | | | |
|--------------|--------------------------|--------|---------------------------|--------------------------|--------|----------|---------------------------|
| | Pounds of grain per acre | % hull | Pounds of kernel per acre | Pounds of grain per acre | % hull | % kernel | Pounds of kernel per acre |
| 1919..... | 750 | | | 2,580 | | | |
| 1920..... | 1,320 | | | 2,340 | | | |
| 1921..... | 1,000 | | | 1,450 | | | |
| 1922..... | 1,600 | | | 3,150 | | | |
| 1923..... | 925 | | | 1,800 | | | |
| Average..... | 1,119 | 0 | 1,119 | 2,264 | 28.72 | 71.28 | 1,614 |

The percentage of hull in Banner represents the average of four years at Cap Rouge, and the conclusion is that Hulless Oats should not be grown in Central Quebec as a general crop.

SIDE OATS.—The main distinguishing feature of this group is the unilateral panicles, the branches starting from many points of the rachis but nearly all converging to one side. This compactness of head is deceiving and leads to the general overestimation of probable yield. There is not much to recommend these oats, except their rather striking appearance in the field.

One of the great disadvantages of Side Oats is the poor quality of the straw. It is coarse and looks as if it would stand up well, but, as a general rule, the contrary is the case. Experiments at Macdonald College have shown that the percentage of crop lodged was 18.8 for Side Oats like Early Gothland, compared with 16.9 for spreading oats like Banner. Moreover, the straw is brittle, and loss is liable to occur through breaking of heads.

Side Oats should not be sown until higher-producing varieties are brought out with better straw. When Longfellow was developed at the Central Experimental Farm, Ottawa, from a cross made in 1903 between Tartar King and Banner, it was hoped that it would prove useful, but when compared with Banner, at the Cap Rouge Station, it proved to be inferior. (See table 4).

TABLE 4.—COMPARISON OF A WELL-BRED SIDE OAT WITH A SPREADING VARIETY

| Year | Side Oat "Longfellow" | | Spreading Oat "Banner" | | | |
|--------------|--------------------------|--------|---------------------------|--------------------------|--------|---------------------------|
| | Pounds of grain per acre | % hull | Pounds of kernel per acre | Pounds of grain per acre | % hull | Pounds of kernel per acre |
| 1920..... | 2,070 | ..... | ..... | 2,340 | ..... | ..... |
| 1921..... | 1,400 | ..... | ..... | 1,450 | ..... | ..... |
| 1922..... | 2,375 | ..... | ..... | 3,150 | ..... | ..... |
| 1923..... | 1,375 | ..... | ..... | 1,800 | ..... | ..... |
| 1924..... | 2,475 | ..... | ..... | 2,550 | ..... | ..... |
| 1925..... | 1,968 | ..... | ..... | 2,208 | ..... | ..... |
| Average..... | 1,944 | 30.45 | 1,352 | 2,250 | 28.72 | 1,604 |

There is a tendency amongst many farmers to grow oats of this group because they appeal to the eye, but everything should be done to discourage their dissemination in the province of Quebec. Careful experiments have proven that they are not suitable. Mr. Emile Lods at Macdonald College states, "Even the best of these varieties, the Early Gothland, proved to be inferior to the spreading type in a ten-year test. Under existing conditions, then, it must be recognized that the side-headed varieties are absolutely unsatisfactory because of the low yields of extremely inferior grain." There is no reason for anybody to grow Side Oats in this part of Canada.

SPREADING OATS.—The main thing which separates this group from the preceding one is that the panicles are equilateral instead of unilateral. Experiments at Cap Rouge have conclusively shown that Spreading Oats will yield not only more pounds of grain, but, especially, more pounds of kernel per acre than either Hulless Oats or Side Oats. The next point to determine is what subdivision of this group will give the best satisfaction under certain conditions.

EARLY VERSUS LATE VARIETIES OF SPREADING OATS

One of the main factors in determining the adaptation of oats to a district is the length of the growing season. There are certain parts of the

country where the season is so short that an early variety must be used, and there are other parts where a late variety, though having lots of time to mature, would happen to head during a period of usual drought which an earlier one would escape.

Amongst the supposed advantages of the early varieties is that the catch of grass and clover seed is much better because the nurse-crop is removed sooner; whilst a disadvantage might be that if haying is late the grain harvest would come at the same time.

As will be seen by table 5, a late variety did better than early ones at the Cap Rouge Experimental Station where the average length of the frost-free season has been 136 days, from 1912 to 1925 inclusive.

TABLE 5.—A COMPARISON OF THREE VARIETIES OF SPREADING OATS OF DIFFERENT SEASONS

| Year | Early Oat "Daubeney" | | | | Late Oat "Banner" | | | | Early Oat "Alaska" | | | |
|-----------|--------------------------|----------------|----------|---------------------------|--------------------------|----------------|----------|---------------------------|--------------------------|----------------|----------|---------------------------|
| | Pounds of grain per acre | Days to mature | % kernel | Pounds of kernel per acre | Pounds of grain per acre | Days to mature | % kernel | Pounds of kernel per acre | Pounds of grain per acre | Days to mature | % kernel | Pounds of kernel per acre |
| 1911.. | 2,880 | 76 | ..... | ..... | 2,820 | 87 | ..... | ..... | ..... | ..... | ..... | ..... |
| 1913.. | 2,400 | 101 | ..... | ..... | 2,340 | 112 | ..... | ..... | ..... | ..... | ..... | ..... |
| 1914.. | 2,000 | 82 | ..... | ..... | 1,960 | 94 | ..... | ..... | ..... | ..... | ..... | ..... |
| 1915.. | 1,965 | 84 | ..... | ..... | 2,404 | 92 | ..... | ..... | ..... | ..... | ..... | ..... |
| 1916.. | 1,708 | 91 | ..... | ..... | 2,398 | 98 | ..... | ..... | ..... | ..... | ..... | ..... |
| Average.. | 2,191 | 87 | 74.39* | 1,630 | 2,384 | 97 | 71.28 | 1,699 | ..... | ..... | ..... | ..... |
| 1922.. | ..... | ..... | ..... | ..... | 3,150 | 104 | ..... | ..... | 2,100 | 84 | ..... | ..... |
| 1923.. | ..... | ..... | ..... | ..... | 1,800 | 107 | ..... | ..... | 1,875 | 90 | ..... | ..... |
| 1924.. | ..... | ..... | ..... | ..... | 2,550 | 110 | ..... | ..... | 1,875 | 92 | ..... | ..... |
| 1925.. | ..... | ..... | ..... | ..... | 2,208 | 104 | ..... | ..... | 1,704 | 92 | ..... | ..... |
| Average.. | ..... | ..... | ..... | ..... | 2,427 | 106 | 71.28 | 1,730 | 1,888 | 89 | 77.78 | 1,468 |

*All percentages of hull were determined at Cap Rouge except in the case of Daubeney, figures for which are from Macdonald College.

From table 5 it is seen that, all other things equal, the variety which matures late in this district is a heavier yielder than the earlier one.

TWO BEST VARIETIES COMPARED

In choosing a variety, the main end in view is to secure the highest possible yield of kernel of the best grade of grain. The question of quality of product for marketing purposes is an important one; and this is why Gold Rain, a variety yielding a little more than Banner, is not recommended, for the yellowish colour of its grain is far from popular with buyers. It must also be remembered that there is no correlation between percentage of hull and weight per measured bushel, so that a variety heavy per measured bushel is not necessarily of good quality.

Strength of straw and resistance to disease will no doubt affect yield, but the most important factor is the inherent yielding power of a variety. General appearance is no safe guide, and trial plots alone can judge among varieties. Amongst the varieties that have been tested at the Cap Rouge Experimental Station since 1911, the following did not produce enough to warrant keeping them: Abundance, Clydesdale, Eighty Day, Ligowo, O.A.C. 72, Siberian, Thousand Dollar, Twentieth Century.

The two varieties which have consistently been at the top are Banner and Victory. Table 6 gives details.

TABLE 6.—A COMPARISON OF THE TWO BEST VARIETIES OF LATE SPREADING OATS

| Year | Late Spreading Oats, "Banner" | | | Late Spreading Oats, "Victory" | | |
|--------------|-------------------------------|--------|---------------------------|--------------------------------|--------|---------------------------|
| | Pounds of grain per acre | % hull | Pounds of kernel per acre | Pounds of grain per acre | % hull | Pounds of kernel per acre |
| 1911..... | 2,820 | ..... | ..... | 2,460 | ..... | ..... |
| 1913..... | 2,340 | ..... | ..... | 2,760 | ..... | ..... |
| 1914..... | 1,960 | ..... | ..... | 1,580 | ..... | ..... |
| 1915..... | 2,404 | ..... | ..... | 1,997 | ..... | ..... |
| 1916..... | 2,398 | ..... | ..... | 2,458 | ..... | ..... |
| 1917..... | 2,040 | ..... | ..... | 2,490 | ..... | ..... |
| 1918..... | 1,410 | ..... | ..... | 1,950 | ..... | ..... |
| 1919..... | 2,580 | ..... | ..... | 1,740 | ..... | ..... |
| 1920..... | 2,340 | ..... | ..... | 2,160 | ..... | ..... |
| 1921..... | 1,450 | ..... | ..... | 1,625 | ..... | ..... |
| 1922..... | 3,150 | ..... | ..... | 2,750 | ..... | ..... |
| 1923..... | 1,800 | ..... | ..... | 1,975 | ..... | ..... |
| 1924..... | 2,550 | ..... | ..... | 2,675 | ..... | ..... |
| 1925..... | 2,208 | ..... | ..... | 2,184 | ..... | ..... |
| Average..... | 2,244 | 28.72 | 1,601 | 2,200 | 28.41 | 1,571 |

This is a test of long duration, and the summary in the table shows that there is no need of importing Victory oats from the West into central Quebec when good Banner seed is available.

BANNER OATS

Banner oats is no doubt the most popular variety grown in Canada, especially in the Eastern Provinces. In the leaflet "Growing Oats in Quebec", the Provincial Department of Agriculture of Quebec says that of all varieties, Banner has proved the most suitable, being hardy, productive, easily satisfied, and having a good firm straw.

When the plant of this variety is young, the leaf is fairly broad, the leaf sheath and lamina glabrous, the colour dark green; the straw is strong and of good length; the panicle is spreading, rachis stiff, branches short and ascending sharply, though slightly bending when nearing maturity; the spikelet generally has two grains and bosom oats are few; the colour of hull is yellowish white; the grain is white, long, and wedge shaped; there are many dorsal awns. Of course, conditions of environment may change some of these points.

The long rather thin grain of Banner has led many people to believe that it does not yield as well as other varieties with a shorter and plumper grain, but we have shown in this pamphlet that this old standard variety can compete with them all. Its most dangerous rival is Victory, now grown extensively in the West and shipped East by the car-load. Nobody growing good Banner should, however, leave it for the newcomer, as it has been proved that a pure strain, grown on good soil, well cleaned and graded, does not degenerate.

STRAINS OF BANNER OATS

It cannot be denied that there is room for improvement in Banner oats; one strain cannot suit all districts where climate and soils differ, and it would seem hard to chose a best strain for all conditions of a certain territory. But the province of Quebec is particularly fortunate in that three strains have been evolved which will probably meet the demands of the greatest number of growers. These strains are Banner O.-49 from the Central Experimental Farm, Banner M. C.-44 from Macdonald College, and Banner C. R.-31 from the Cap Rouge Experimental Station. These three strains are being carefully tested at six Colleges of Agriculture and Experimental Stations in the province of Quebec. Farmers will make no mistake in procuring seed from the College or Experimental Station which is nearest to them, or from a well-known local grower of the strain produced in their district. Good advice is to shun unknown salesmen, or known persons representing unknown firms. If this be followed, there will be fewer disappointments.

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